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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,379	09/08/2003	Chuan-Cheng Tu	U68.312-0001	9434

164 7590 03/30/2007  
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EXAMINER

PHAM, LONG

ART UNIT	PAPER NUMBER
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2814

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/30/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/657,379	TU ET AL.	
	Examiner	Art Unit	
	Long Pham	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 52 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 52 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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## DETAILED ACTION

### Rejections and/or objections as previously applied

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1 and 5 are rejected under 35 U.S.C. 102(a) as being anticipated by the applicant's admitted prior art (AAPA) of this application.

With respect to claim 1, AAPA teaches a light emitting diode (LED), comprising of (see figs. 1 and 2 and associated text of this application):

A semiconductor layer 30 of a first polarity;

A active layer 40, located on the semiconductor layer of the first polarity;

A semiconductor layer of a second polarity, located on the active layer; and

A contact layer 55, located on the semiconductor layer of a second polarity, wherein at least one side of a stacked structure at least composed of the active layer, the semiconductor layer of the second polarity and the contact layer has a wave shape border in a top view of the LED, thereby inherently reducing the probability of reflecting the light emitted from the active layer, thus making light emitted from the active layer penetrate through the at least one side and be emitted outside the LED.

How the wave-shape border is formed has not been given patentable weight.

With respect to claim 5, AAPA further teaches the wave-shape border in the top view of the LED is triangular wave-shape border.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 4, 6, 7, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) of this application as applied to claims 1 and 5 above, and further in view of Sugimoto et al. (JP 04061184) (a reference of record).

With respect to claims 2 and 4, AAPA fails to teach the semiconductor layers having n or p polarity are made of GaN.

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However, the use of GaN as semiconductor layers having n or p polarity in forming a LED is well-known in the art.

With respect to claim 3, AAPA fails to teach that the active layer is made of InGaN.

However, the use of InGaN as active layer of a LED is well-known in the art.

With respect to claim 6, AAPA fails to teach the deformed dimension of the at least one side or that it is greater than an equivalent emitting wavelength of the LED.

However, since AAPA teaches maximizing the emission of light from the LED, It would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value for the deformed dimension of the at least one side through routine experimentation and optimization to obtain optimal light emission because in the absense of unexpected results and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claim 7, AAPA fails to teach an incident angle of the light emitted from the active layer to the at least one side is less than a reflective critical angle of the at least one side.

However, since AAPA teaches maximizing the emission of light from the LED, It would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal value for the incident light of the light emitted from the active layer through routine experimentation and optimization to obtain optimal light emission because in the absense of unexpected results and it has been held that it is not inventive to discover the optimum or workable ranges of a result-effective variable within given prior art conditions by routine experimentation. See MPEP 2144.05.

With respect to claims 8 and 9, AAPA fails to teach forming a valley or trench or groove that extends from an upper surface of the semiconductor of the second polarity through the active layer to the substrate.

Sugimoto et al. teach a light emitting device in which a trench or groove or valley 7 extends from an upper surface of semiconductor layers through the active layer 3 to substrate 1 to improve yield of light efficiency. See the English abstract and figs. 1 and 2.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the above teaching of Sugimoto et al. into Ito's device to improve yield of light efficiency. See the English abstract and figs. 1 and 2.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applicant's admitted prior art (AAPA) of this application in combination with Sugimoto et al. (JP 04061184) (a reference of record).

With respect to claim 52, AAPA teaches a light emitting diode (LED), comprising of (see figs. 1 and 2 and associated text of this application):

A semiconductor layer 30 of a first polarity;

A active layer 40, located on the semiconductor layer of the first polarity;

A semiconductor layer of a second polarity, located on the active layer; and wherein at least one side of a stacked structure at least composed of the

active layer, the semiconductor layer of the second polarity has a wave shape border in a top view of the LED.

With respect to claim 52, AAPA fails to teach forming a valley or trench or groove that extends from an upper surface of the semiconductor of the second polarity through the active layer to the substrate.

Sugimoto et al. teach a light emitting device in which a trench or groove or valley 7 extends from an upper surface of semiconductor layers through the active layer 3 to substrate 1 to improve yield of light efficiency. See the English abstract and figs. 1 and 2.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to incorporate the above teaching of Sugimoto et al. into Ito's device to improve yield of light efficiency. See the English abstract and figs. 1 and 2.

Further with respect to claim 52, since AAPA in combination with Sugimoto et al. teach the claimed structure, the probability of reflecting the light emitted from the active layer would inherently be reduced, thus making light emitted from the active layer penetrate through the at least one side and be emitted outside the LED.

#### ***Response to Arguments***

Applicant's arguments filed 01/05/07 have been fully considered but they are not persuasive. See below.

In response to the applicant's arguments in the paragraphs on page 5 of the amendmend dated 01/05/07, it is submitted that the top view of the stacked comprising the active layer, the semiconductor layer, the contact layer of fig. 1 of AAPA has wave-shape border (see the upper right hand corner of 55 of fig. 1).

#### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

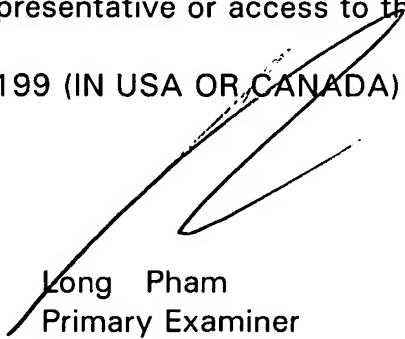
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on Mon-Frid, 10am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Long Pham  
Primary Examiner  
Art Unit 2814

LP